



# **Auto Battery Analyzer**

## **User's Manual**

**Item: BA101**

# 1 Product Summary

## 1.1 Product Profile

BA101 Battery Tester adopts currently the world's most advanced conductance testing technology to easily, quickly and accurately measure the actual cold cranking amps capability of the vehicle starting battery, healthy state of the battery itself, and common fault of the vehicle starting system and charging system, which can help maintenance personnel to find the problem quickly and accurately, thus to achieve quick vehicle repair.

1. Test all automotive cranking lead acid battery, including ordinary lead acid battery, AGM flat plate battery, AGM spiral battery, and Gel battery, EFB battery, etc.
2. Directly detect bad cell battery.
3. Polarity reverse connection protection, reverse connection will not damage the tester or affect the vehicle and battery.
4. Directly test the battery with loss of electricity, no need to full charge before testing.
5. Testing standards include currently the world's majority of battery standards, CCA, BCI, CA, MCA, JIS, DIN, IEC, EN, SAE, GB.
6. Support multi-languages, customer can select different language package, which includes: Chinese Simple, Chinese Traditional, English, Japanese, Russian, Spanish, French, Italian, German, etc. Other languages can also be customized according to user's need.

## 1.2 Product Function

Main functions of BA101 battery tester include: battery test, cranking test, charging test and other additional functions.

**Battery test** is mainly targeted to analyze the battery healthy status to calculate the actual cold cranking capability of the battery and the aging extent, which provide reliable analysis evidence for the test and maintenance of the battery. It notifies the user to replace battery in advance when the battery getting aged.

**Cranking test** is mainly to test and analyze the starting motor. Through testing the actual required cranking current and cranking voltage of the starting motor, it can find out whether the starting motor works fine. There are several reasons why the starting motor is abnormal: lubricating system fault causing the starting loaded torque increasing or rotor friction of the starting motor causing the increasing friction of the starting motor itself.

**Charging test** is to check and analyze the charging system, including generator, rectifier, rectifier diode, etc., thus to find out whether the output voltage of the generator is normal, the rectifier diode works fine and the charging current is normal. Suppose one of the above mentioned parts is not in normal situation, it will lead to over charge or incomplete charge of the battery, thus the battery will be quickly damaged and also greatly shorten the using life of other loaded electrical appliance.

**Additional functions** include: Set language, voltmeter and screen brightness adjustment.

## 1.3 Technical Parameters

1. Cold Cranking Amps Measure Range:

Measure Standard	Measure Range
CCA	100-2000
BCI	100-2000
CA	100-2000
MCA	100-2000
JIS	26A17--245H52
DIN	100-1400
IEC	100-1400
EN	100-2000
SAE	100-2000
GB	100-1400

2. Voltage Measure Range: 8-30V DC

## 1.4 Working Environment Requirement

Working Environment Temp.: -20°C-60°C

It is applicable for automotive manufacturers, automotive maintenance and repair workshops, automotive battery factories, automotive battery distributors, and educational organizations, etc.

## 2 PRODUCT INFORMATION

### 2.1 Tool Description



- **Up / Down keys:** Select upwards or downwards via white UP and DOWN keys.
- **Exit key:** Exit to previous menu via blue EXIT key.
- **ENTER key:** Confirm the selection via green ENTER key
- **Mini-USB Socket (in the side of the product):** Connect to computer for print via USB cable.

### 2.2 Product Specifications

- 1). Display: LCD, backlit
- 2). Operating Temperature: 0 to 50°C (-32 to 122 F°)
- 3). Storage Temperature: -20 to 70°C (-4 to 158 F°)
- 4). Power—provided via 12V battery
- 5). Dimensions:

Length	Width	Height
110 mm ( 4.3" )	70 mm ( 2.75" )	16mm (0.63" )
- 6). Weight: 216g

### 2.3 Accessories Included

- 1) User Manual -- Instructions on tool operations

- 2) USB cable -- Provides link to tool and computer for print..
- 3). CD--- Print software inside.

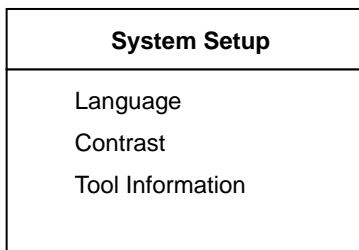
## 2.4 Product Setup

The tool allows you to make the following adjustments and settings:

- 1) Language: Selects desired language.
- 2) Contrast adjustment: Adjusts the contrast of the LCD display.
- 3) Tool information: The tool show the version and produced date.

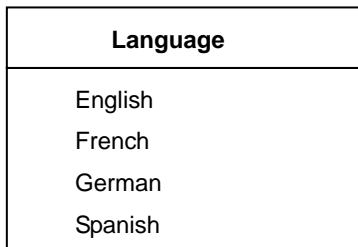
### To enter the Tool Setup menu

From the second startup screen, press Exit button to enter Main menu. Press Down button to select the Tool Setup function.



### Language:

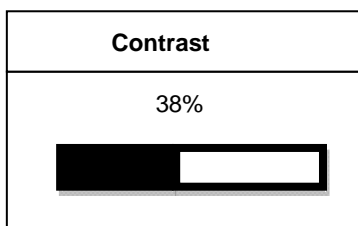
- 1) From Tool Setup menu, use Enter button to select Language



- 2) Use UP and DOWN button to select the desired language and press ENTER button to save your selection and return to previous menu.

### Contrast

- 1) From Tool Setup menu, use Enter button to select contrast.
- 2) Use UP and DOWN button to select the contrast value and press ENTER button to save your selection and return to previous menu.



## Tool Information

From Tool Setup menu, use Enter button to select Tool Information

Press exit to return the previous menu.

Tool Information
Software Version: 1.00
Hardware Version: 1.00

## 3 Battery Test

After entering battery test program, tester displays the tester model and version

Tester will display the following contents in a sequence, select accordingly.

### 3.1 Quick test

It can make sure the battery status, including voltage, CCA, electronic resistance, rated CCA, charging value, healthy value and testing result in one second. Once input the AH value—battery rated capacity, which is marked in the label of the battery.

1). Press UP/DOWN key to select the Quick test, then press ENTER key to confirm.

Main Menu
1.Quick Test
2.Battery in Vehicle
3.Out of Vehicle
4.Review Data
5. Print Data
6.System Setup

2). Input the rated battery capacity—xx AH, in general, the battery capacity for 12V vehicle is above 30AH.

Input AH value
50 A-H
Please input the A-HR value in the Label of the battery.

3). Then press enter key, the testing result will show one of these, as below

. Battery test result includes 5 types as following:

#### 1) Good Battery

Healthy:96%	490CCA
Charge:98%	12.64V
Internal R=6.1mΩ	
Rated: 500A	
GOOD BATTERY	

The battery is without any problem, please be relaxed to use!

**2) Good, Recharge**

Healthy:78%	440CCA
Charge:30%	12.20V
Internal R=7.2mΩ	
Rated: 500A	
GOOD, RECHARGE	

Good battery but low current, recharge before using.

**3) Replace**

Healthy:46%	490CCA
Charge:80%	12.68V
Internal R=18.1mΩ	
Rated: 500A	
REPLACE	

The battery is near to or already reached the end of the using life, replace battery, otherwise, bigger danger will be followed.

**4) Bad Cell, Replace**

Healthy:0%	0CCA
Charge:20%	10.64V
Internal R=45.2mΩ	
Rated: 500A	
BAD CELL, REPLACE	

Battery interior damaged, bad cell or short circuit, replace battery.

**5) Charge, Retest**

Healthy:39%	310CCA
Charge:20%	12.08V
Internal R=30.1mΩ	
Rated: 500A	
CHARGE-RETEST	

Unstable battery shall be recharged and retested to avoid error. If same test result appears after recharge and retest, the battery is regarded as damaged, replace the battery.

**Battery In-Vehicle or Battery Out-Of-Vehicle**

Press UP/DOWN key to select the battery location, in vehicle or out of vehicle, then press ENTER key to confirm.

Battery in vehicle means battery is connected with vehicle generator or vehicle electrical appliance.

Main Menu
1.Quick Test
2.Battery in Vehicle
3.Out of Vehicle
4.Review Data
5. Print Data
6.System Setup

**3.2 Battery in vehicle**

Choose the battery in vehicle and press Enter key, then it will enter the below menu.

Test in Vehicle
1.Battery Test 2.Cranking Test 3.Charging Test

### 3.2.1 Batter test in vehicle

When surface charge detected by the tester, it prompts "SURFACE CHARGE, TURN LIGHTS ON"

Turn lights on as prompted to eliminate battery surface charge, tester will then display the following messages in a sequence:

Battery Test
1.Check surface charge, Turn lights on. 2. Take headlights on about 10 seconds. 3.Turn lights off.

Now the tester detects the surface charge has been eliminated, turn lights off as prompted, then press ENTER key. The tester will recover automatic test

OUT-OF-VEHICLE means battery is not connected with any of the vehicle loaded, i.e. battery connection is cut off.

#### Select Battery Type

After the battery charge status selected, tester will prompt to select battery type, i.e. Regular Flooded, AGM Flat Plate or AGM Spiral, Gel and EFB battery. Press UP/DOWN key to select battery type, then press OK key to confirm

Battery Type
1.Regular Flooded. 2. AGM Flat Plate. 3.AGM spiral 4.GEL 5.EFB

#### Battery System Standard and Rating

BA101 battery tester will test each battery according to the selected system and rating.

Use UP/DOWN key to select according to the actual system standard and rating marked on the battery. Use UP/DOWN key to select according to the actual system standard and rating marked on the battery. See in the below picture, the arrow indicated location.



CCA: Cold Cranking Amps, specified by SAE&BCI, most frequently used value for starting battery at 0°F (-18°C).

BCI: Battery Council International standard

CA: Cranking Amps standard, effective starting current value at 0°C

MCA: Marine Cranking Amps standard, effective starting current value at 0°C.

JIS: Japan Industrial Standard, displayed on the battery as combination of the numbers and letters, e.g. 55D23,80D26.

DIN: German Auto Industry Committee Standard

IEC: Internal Electro technical Commission Standard

EN: European Automobile Industry Association Standard

SAE: Society of Automotive Engineers Standard

GB: China National Standard

<b>Select Input</b>
CCA

**Rating range as following:**

Measure Standard	Measure Range
CCA	100-2000
BCI	100-2000
CA	100-2000
MCA	100-2000
JIS	26A17--245H52
DIN	100-1400
IEC	100-1400
EN	100-2000
SAE	100-2000
GB	100-1400

Input correct test standard and rating, press ENTER key, tester starts to test, and dynamic interface "TESTING" prompted. See below:

<b>Setting Rate</b>
500 CCA

It takes around 3 seconds to display the battery test result.

### Battery Test Result

Battery test result includes 5 types as following:

#### 1) Good Battery

Healthy:96%	490CCA
Charge:98%	12.64V
Internal R=6.1mΩ	
Rated: 500A	
GOOD BATTERY	

The battery is without any problem, please be relaxed to use!



## 2) Good, Recharge

Healthy:78%	440CCA
Charge:30%	12.20V
Internal R=7.2mΩ	
Rated: 500A	
GOOD, RECHARGE	

Good battery but low current, recharge before using.

## 3) Replace

Healthy:46%	490CCA
Charge:80%	12.68V
Internal R=18.1mΩ	
Rated: 500A	
REPLACE	

The battery is near to or already reached the end of the using life, replace battery, otherwise, bigger danger will be followed.

## 4) Bad Cell, Replace

Healthy:0%	0CCA
Charge:20%	10.64V
Internal R=45.2mΩ	
Rated: 500A	
BAD CELL, REPLACE	

Battery interior damaged, bad cell or short circuit, replace battery.

## 5) Charge, Retest

Healthy:39%	310CCA
Charge:20%	12.08V
Internal R=30.1mΩ	
Rated: 500A	
CHARGE-RETEST	

Unstable battery shall be recharged and retested to avoid error. If same test result appears after recharge and retest, the battery is regarded as damaged, replace the battery.

Attention: If "Replace" resulted from IN-VEHICLE mode, it might be the reason that vehicle cable is not well connected with the battery.

Ensure to cut off the cable and retest the battery under OUT-OF-VEHICLE before making a decision to replace battery.

NOTE: After testing, if need to Exit, press EXIT key to directly Exit to the startup interface.

After testing: if it's "IN-VEHICLE" test state, press ENTER key will bring to Cranking Test.

## 3.2.2 Cranking Test

Tester prompts as following:

<b>Cranking Test</b>
Start Engine

Starting the engine as prompted, tester will automatically complete the cranking test and display the result.

<b>Cranking Test</b>	
RPM Detected	

Normally, cranking voltage value lower than 9.6V is regarded as abnormal and it is ENTER if it is higher than 9.6V.

Test result of the tester includes actual cranking voltage and actual cranking time.

<b>Cranking Test</b>	
Times	780ms
Cranking	Normal
	10.13V

When cranking test is abnormal, battery test result will also be displayed at the same time.

<b>Cranking Test</b>	
Times	1020ms
Cranking	Low
Replace	10.13V

This is for the convenience of the maintenance personnel to quickly know the whole state of the starting system according to the data.

After testing finished, do not shut down the engine, press ENTER key to enter Charging Test.

### 3.2.3 Charging System and Rectifier Diode Test

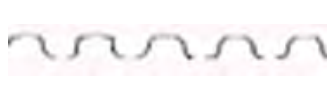
When enter the charging test, please choose "Charging Test?"

<b>Test in Vehicle</b>	
1.Battery Test	
2.Cranking Test	
3.Charging Test	

Press ENTER key again to start the charging test.

NOTE: Do not shut down the engine during the test. All electrical appliance and device are in OFF state. Turn on/off any electrical appliance in the vehicle during the test will affect the accuracy of the test result.

Tester will do the following tests in a sequence:

<b>Ripple Test</b>	
	
95mV	14.32V

For ripple test, tester will display the real time ripple and meanwhile, shows ripple volt and charging volt values at the bottom line.

It takes approx. 6 seconds for the ripple test.

After the ripple test, tester will automatically start the loaded voltage test.

<b>Charging Test</b>	
Loaded Testing	
****	

Loaded Volt Test takes approx. 3 seconds, then it hints "Step on accelerator to increase engine rotating speed"

<b>Charging Test</b>
Increasing RPM to 2500 r/min And keep it 5 seconds. Press OK to continue.

Operate accordingly to increase the engine rotating speed to 2500 turns or above, and keep for 5 seconds.

Tester starts the charging volt test after increase rev detected.

<b>Charging Test</b>
Testing ****

After the test finished, tester displays the effective charging volts, ripple test result and charging test result.

<b>Cranking Test</b>	
Loaded	14.16V
Unloaded	14.39V
Replace	15mV
<b>Charging Normal</b>	

NOTE: If no increase rev detected, it shall be the fault of generator regulator or connection with battery failed. Tester will try 3 times to further detect, if still failed, it will skip the increase rev detect and the test result displays "No Volt Output". See below:

Check the connection between generator and battery, then retest.

Charging Test Result:

1) Charging Volt: Normal

Charging system shows the generator output normal, no problem detected.

2) Charging Volt: Low

Charging volt of the charging system is low.

Check drive belt of the generator whether slip or running off. Check the connection between generator and battery is normal or not.

If both of the drive belt and the connection are in good condition, follow the manufacturer's suggestion to eliminate generator fault.

3) Charging Volt: High

Generator output volt is high.

Since most of the vehicle generators are using internal regulator, the generator assembly has to be replaced. (Some old style cars are using external regulator, then directly replace the regulator.)

The normal high volt of the voltage regulator is maximum  $14.7 \pm 0.5V$ . If charging volt is too high, it will overcharge the battery. Therefore the battery life will be shortened and troubles will be caused.

4) No Volt Output:

No generator volt output is detected. Check the generator connection cable and the belt whether they are normal.

5) Diode Test:

Through the test of charging current ripple, tester will find out whether the diode is normal or not. When ripple volt is too high, it proves at least one diode is damaged. Check and replace the diode.

Till now, all tests have been done.

### 3.3 Battery out of vehicle test

OUT-OF-VEHICLE means battery is not connected with any of the vehicle loaded, i.e. battery connection is cut off.

Choose the battery out of vehicle test

<b>Main Menu</b>
1.Quick Test 2.Battery in Vehicle 3.Out of Vehicle 4.Review Data 5. Print Data 6.System Setup

### 3.3.3 Select Battery Type

After the battery charge status selected, tester will prompt to select battery type, i.e. Regular Flooded, AGM Flat Plate or AGM Spiral, Gel and EFB battery. Press UP/DOWN key to select battery type, then press OK key to confirm

<b>Battery Type</b>
1.Regular Flooded. 2. AGM Flat Plate. 3.AGM spiral 4.GEL 5.EFB

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JIS: Japan Industrial Standard, displayed on the battery as combination of the numbers and letters, e.g. 55D23,80D26.

DIN: German Auto Industry Committee Standard

IEC: Internal Electro technical Commission Standard

EN: European Automobile Industry Association Standard

SAE: Society of Automotive Engineers Standard

GB: China National Standard

<b>Select Input</b>
CCA

Rating range as following:

Measure Standard	Measure Range
CCA	100-2000
BCI	100-2000
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MCA	100-2000
JIS	26A17--245H52
DIN	100-1400
IEC	100-1400
EN	100-2000
SAE	100-2000
GB	100-1400

Input correct test standard and rating, press ENTER key, tester starts to test, and dynamic interface "TESTING" prompted. See below:

Setting Rate
500 CCA

It takes around 3 seconds to display the battery test result.

### Battery Test Result

Battery test result includes 5 types as following:

#### 1) Good Battery

Healthy:96%	490CCA
Charge:98%	12.64V
Internal R=6.1mΩ	
Rated: 500A	
GOOD BATTERY	

The battery is without any problem, please be relaxed to use!

## 2) Good, Recharge

Healthy:78%	440CCA
Charge:30%	12.20V
Internal R=7.2mΩ	
Rated: 500A	
GOOD, RECHARGE	

Good battery but low current, recharge before using.

## 3) Replace

Healthy:46%	490CCA
Charge:80%	12.68V
Internal R=18.1mΩ	
Rated: 500A	
REPLACE	

The battery is near to or already reached the end of the using life, replace battery, otherwise, bigger danger will be followed.

## 4) Bad Cell, Replace

Healthy:0%	0CCA
Charge:20%	10.64V
Internal R=45.2mΩ	
Rated: 500A	
BAD CELL, REPLACE	

Battery interior damaged, bad cell or short circuit, replace battery.

## 5) Charge, Retest

Healthy:39%	310CCA
Charge:20%	12.08V
Internal R=30.1mΩ	
Rated: 500A	
CHARGE-RETEST	

Unstable battery shall be recharged and retested to avoid error. If same test result appears after recharge and retest, the battery is regarded as damaged, replace the battery.

## 3.4 Review Data

Choose the function of Review Data

Main Menu
1.Quick Test
2.Battery in Vehicle
3.Out of Vehicle
4.Review Data
5. Print Data
6.System Setup

Check the history of battery testing result

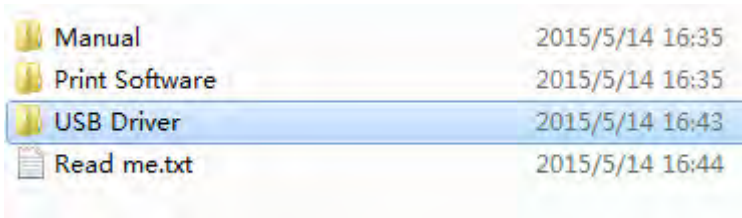
Healthy:96%	490CCA
Charge:98%	12.64V
Internal R=6.1mΩ	
Rated: 500A	
GOOD BATTERY	

### 3.5 Print Data

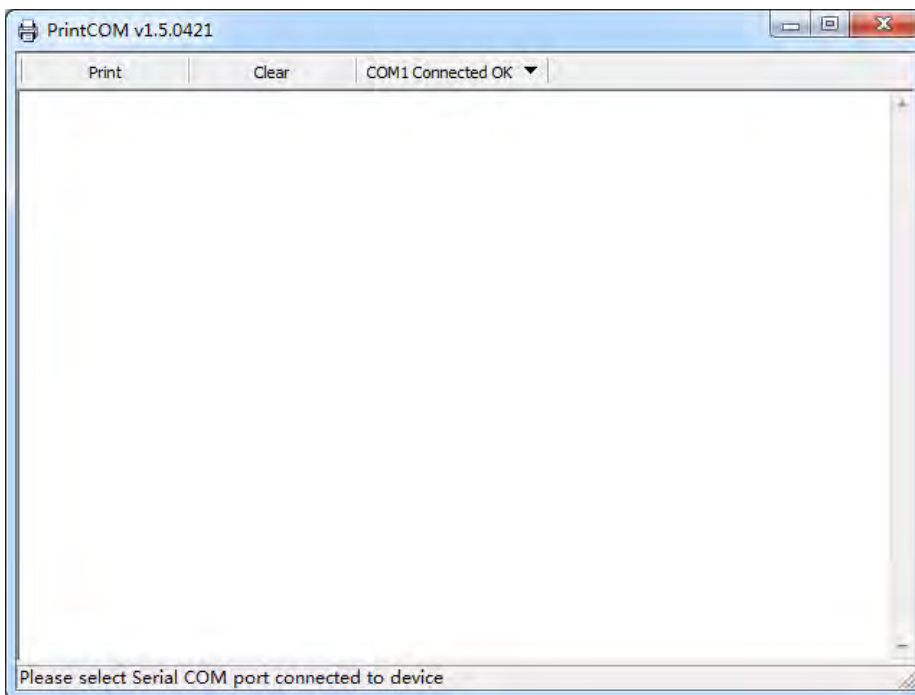
Before choose the print data function, it is necessary to connect the tool to the computer via USB cable.

Once all are available, please kindly insert the CD to the computer

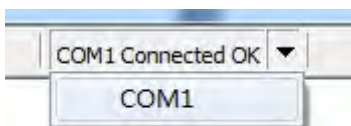
1. Install the USB driver firstly.



2. Then open the Print software



3. Choose the COM Port NO.



If there are some data history in print software, please kindly clear them.

4. Choose the function of Print Data in the tool

Main Menu
1.Quick Test
2.Battery in Vehicle
3.Out of Vehicle
4.Review Data
5. Print Data
6.System Setup

5.Once the data is transferred to the computer, the print software will show these information

Healthy:96%	490CCA
Charge:98%	12.64V
Internal R=6.1mΩ	
Rated: 500A	
GOOD BATTERY	

Besides, the tool will turn to below menu.

Print Data
OK

Press exit to return

## 3.6 System setup

Please kindly review 2.4 Product setup

## 4.WARRANTY AND SERVICE

### 4.1 Limited One Year Warranty

We warrants to its customers that this product will be free from all defects in materials and workmanship for a period of one (1) year from the date of the original purchase, subject to the following terms and conditions:

1. The sole responsibility of us under the Warranty is limited to either the repair or, at the option of us, replacement of the Scan Tool at no charge with Proof of Purchase. The sales receipt may be used for this purpose.
2. This warranty does not apply to damages caused by improper use, accident, flood, lightning, or if the product was altered or repaired by anyone other than the Manufacturer's Service Center.
3. We shall not be liable for any incidental or consequential damages arising from the use, misuse, or mounting of the Scan Tool. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

### 4.2 Service Procedures

For technical support, please contact your local store or distributor. If it becomes necessary to return the code reader for repair, contact your local distributor for more information.



